AMENDMENTS TO THE CLAIMS:

The following listing replaces all previous version of the claims:

1. (Cancelled)

2. (Currently Amended) The apparatus of claim ~~1~~12, wherein the joint searcher and channel estimator is arranged to essentially concurrently consider the dimensionally differentiated plural signals provided by the plural antennas for determining plural times of arrival and plural channel coefficients, an arriving wavefront being represented by one of the plural times of arrival and a corresponding one of the plural channel coefficients.

3. (Currently Amended) The apparatus of claim ~~1~~12, wherein the antenna structure comprises an array of plural antennas, and wherein the signals acquired by different antennas of the array are dimensionally differentiated with regard to a spatial dimension.

4. (Original) The apparatus of claim 3, wherein the time of arrival and the channel coefficient are essentially concurrently determined by the joint searcher and channel estimator.

5. (Original) The apparatus of claim 4, wherein the time channel coefficient is a composite channel coefficient which takes into consideration channel impulse responses for channels associated with each of the plural antennas in the antenna array.

6. (Original) The apparatus of claim 3, wherein the antenna array comprises a uniform linear array of plural antennas.

7. (Currently Amended) The apparatus of claim ~~1~~12, wherein the antenna structure comprises an antenna arranged to provide signals for each of successive sets of pilot data received by the antenna as the dimensionally differentiated signals, whereby

the signals acquired by the antenna are dimensionally differentiated with regard to a temporal dimension.

8. (Currently Amended) The apparatus of claim ~~1~~12, further comprising a detector arranged to utilize the channel coefficient and the time of arrival to provide a symbol estimate.

9. (Currently Amended) The apparatus of claim ~~1~~12, wherein the wireless communication receiver is a mobile terminal.

10. (Currently Amended) The apparatus of claim ~~1~~12, wherein the wireless communication receiver is a network node.

11. (Cancelled)

12. (Currently Amended) A wireless communication receiver comprising:

an antenna structure arranged to acquire dimensionally differentiated signals;

a joint searcher and channel estimator arranged to essentially concurrently consider the dimensionally differentiated plural signals provided by the antenna structure for determining both a time of arrival and channel coefficient;

~~The apparatus of claim 11,~~

wherein the joint searcher and channel estimator comprises:

an antenna signal matrix in which complex values indicative of the dimensionally differentiated signal received in a sampling window are stored as a function of a sampling window time index and a dimensional differentiation index;

a correlator arranged to locate value(s) in the antenna signal matrix for use in determining the time of arrival and the channel coefficient;

an analyzer arranged to use the value(s) located by the correlator to generate the time of arrival and the channel coefficient;

wherein in locating the values the correlator considers a dimensional reception vector formed from the antenna signal matrix with respect to a sampling window time index, the dimensional receptivity vector having a frequency related to a

difference between phase components of complex values of the dimensional receptivity vector, there being plural possible frequencies for the dimensional receptivity, the plural possible frequencies being represented by a frequency index; and

wherein for each combination of plural possible frequencies and plural time indexes, the correlator is arranged to calculate:

$Y(n,t) = FFT(n,X(:,t))$

wherein t is the sampling window time index;

$X(:,t)$ is the complex antenna matrix, with : representing all antenna indexes for one sampling window time index;

n is the frequency index.

13. (Original) The apparatus of claim 12, wherein for each combination of plural possible frequencies and plural time indexes, the correlator is further arranged to calculate:

$Y(n,t) = \Sigma C_j *FFT(n,X(:,t)), j = 1,K$

wherein C_j is a coding sequence symbol value j and K is a length of the coding sequence.

14. (Original) The apparatus of claim 12, wherein the antenna structure comprises an array of plural antennas, and wherein each of the plural possible frequencies for the dimensional receptivity vector represents a different possible direction of arrival of the arriving wavefront.

15. (Currently Amended) The apparatus of 14, wherein the correlator output comprises Y(n,t), and wherein the analyzer is arranged to determine a maximum absolute value $|Y(n,t)|_{max}$, wherein the analyzer is arranged to use the a sampling window time index t_max at which $|Y(n,t)|_{max}$ occurs as the time of arrival of the arriving wavefront; and wherein the analyzer is arranged to use the ~~a~~ frequency index n_max at which $|Y(n,t)|_{max}$ occurs as the direction of arrival of the arriving wavefront.

16. (Previously Presented) The apparatus of 14, wherein the correlator output comprises Y(n,t), and wherein the analyzer is arranged to determine a maximum absolute value $|Y(n,t)|_{max}$, wherein the analyzer is arranged to obtain an amplitude for the arriving wavefront by dividing $|Y(n,t)|_{max}$ by a number of antennas comprising the antenna array.

17. (Original) The apparatus of claim 12, wherein the antenna structure comprises an antenna which provides signals for each of successive sets of pilot data received by the antenna as the dimensionally differentiated signals, and wherein each of the plural possible frequencies corresponds to a doppler shift.

18. (Previously Presented) The apparatus of 17, wherein the correlator output comprises Y(n,t), and wherein the analyzer is arranged to determine a maximum absolute value $|Y(n,t)|_{max}$, wherein the analyzer is arranged to use a sampling window time index t_max at which $|Y(n,t)|_{max}$ occurs to determine the time of arrival of an arriving wavefront; and wherein the analyzer is arranged to use the a frequency index n_max at which $|Y(n,t)|_{max}$ to determine the doppler shift.

19. (Previously Presented) The apparatus of 17, wherein the correlator output comprises Y(n,t), and wherein the analyzer is arranged to determine a maximum absolute value $|Y(n,t)|_{max}$, wherein the analyzer is arranged to obtain an amplitude for an arriving wavefront by dividing $|Y(n,t)|_{max}$ by a number of sets of pilot data in the series.

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Cancelled)
27. (Cancelled)

28. (Currently Amended) The method of claim ~~27~~35, wherein the antenna structure comprises an array of plural antennas, and further comprising acquiring the dimensionally differentiated signals from different antennas of the array whereby the signals are dimensionally differentiated with regard to a spatial dimension.

29. (Original) The method of claim 28, further comprising essentially concurrently determining the time of arrival and the channel coefficient using a joint searcher and channel estimator.

30. (Original) The method of claim 29, wherein the time channel coefficient is a composite channel coefficient which takes into consideration channel impulse responses for channels associated with each of the plural antennas in the antenna array.

31. (Original) The method of claim 28, further comprising acquiring the dimensionally differentiated signals from a uniform linear array of plural antennas.

32. (Currently Amended) The method of claim ~~27~~35, further comprising receiving, at an antenna of the antenna structure, signals for each of successive sets of pilot data received by the antenna as the dimensionally differentiated signals, whereby the signals acquired by the antenna are dimensionally differentiated with regard to a temporal dimension.

33. (Currently Amended) The method of claim ~~27~~35, further comprising using a detector which utilizes the channel coefficient and the time of arrival to provide a symbol estimate.

34. (Cancelled)

35. (Currently Amended) A method of operating a wireless communication receiver comprising:

acquiring dimensionally differentiated signals at an antenna structure;

concurrently using the dimensionally differentiated signals for determining both a time of arrival and channel coefficient;~~The method of claim 34,~~

storing, in an antenna signal matrix, complex values indicative of the dimensionally differentiated signals received in a sampling window as a function of a sampling window time index and a dimensional differentiation index;

locating value(s) in the antenna signal matrix for use in determining the time of arrival and the channel coefficient;

using the value(s) located to generate the time of arrival and the channel coefficient;

wherein the ~~step~~ act of locating the values further comprises using a dimensional reception vector formed from the antenna signal matrix with respect to a sampling window time index, the dimensional receptivity vector having a frequency related to a difference between phase components of complex values of the dimensional receptivity vector, there being plural possible frequencies for the dimensional receptivity, the plural possible frequencies being represented by a frequency index; and

wherein for each combination of plural possible frequencies and plural time indexes, calculating:

$Y(n,t) = FFT(n,X(:,t))$

wherein t is the sampling window time index;

X(:,t) is the complex antenna matrix, with : representing all antenna indexes for one sampling window time index;

n is the frequency index.

36. (Original) The method of claim 35, wherein for each combination of plural possible frequencies and plural time indexes, calculating:

$Y(n,t) = \Sigma\ C_j * FFT(n,X(:,t)),\ j = 1,K$

wherein C_j is a coding sequence symbol value j and K is a length of the coding sequence.

37. (Original) The method of claim 35, wherein the antenna structure comprises an array of plural antennas, and wherein each of the plural possible frequencies for the dimensional receptivity vector represents a different possible direction of arrival of the arriving wavefront.

38. (Original) The method of claim 37, further comprising in the locating step generating an output which comprises Y(n,t), and further comprising determining a maximum absolute value $|Y(n,t)|_{max}$, using the a sampling window time index t_max at which $|Y(n,t)|_{max}$ occurs as the time of arrival of the arriving wavefront; and using the a frequency index n_max at which $|Y(n,t)|_{max}$ occurs as the direction of arrival of the arriving wavefront.

39. (Original) The method of claim 37, further comprising in the locating step generating an output which comprises Y(n,t), and further comprising:

determining a maximum absolute value $|Y(n,t)|_{max}$; and

obtaining an amplitude for the arriving wavefront by dividing $|Y(n,t)|_{max}$ by a number of antennas comprising the antenna array.

40. (Original) The method of claim 35, wherein the antenna structure comprises an antenna which provides signals for each of successive sets of pilot data received by the antenna as the dimensionally differentiated signals, and wherein each of the plural possible frequencies corresponds to a doppler shift.

41. (Original) The method of claim 40, wherein the locating step further comprises generating an output which comprises Y(n,t), and further comprising:

determining a maximum absolute value $|Y(n,t)|_{max}$;

using a sampling window time index t_max at which $|Y(n,t)|_{max}$ occurs to determine the time of arrival of an arriving wavefront; and

using the a frequency index n_max at which $|Y(n,t)|_{max}$ to determine the doppler shift.

42. (Original) The method of claim 40, wherein the locating step further comprises generating output comprising Y(n,t), and further comprising:

determining a maximum absolute value $|Y(n,t)|_{max}$; and

obtaining an amplitude for an arriving wavefront by dividing $|Y(n,t)|_{max}$ by a number of sets of pilot data in the series.

43. (Cancelled)

44. (Cancelled)

45. (Cancelled)

46. (Cancelled)

47. (Cancelled)

48. (Cancelled)

49. (Cancelled)